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| 10/600,698 | 06/23/2003 | Masakazu Okuda | 053588-5012 | 5737 |
| 9629 | 7590 | 09/15/2004 | EXAMINER | |
| MORGAN LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004 | | | MOUTTET, BLAISE L | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2853 | |

DATE MAILED: 09/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|--|--|
| Office Action Summary | Application No. 10/600,698 | Applicant(s) OKUDA ET AL. AK | |
| | Examiner Blaise L Mouttet | Art Unit 2853 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15, 16 and 18-20 is/are rejected.
- 7) ☒ Claim(s) 14 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>6/23/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Applicant's claim for foreign priority is acknowledged. The foreign priority papers were received June 23, 2003.

Information Disclosure Statement

2. The IDS submitted June 23, 2003 has been considered by the examiner.

Specification

3. The abstract of the disclosure is objected to because of the reference to purported merits of the invention and because of excessive length. The examiner suggests deleting the last two sentences of the abstract.

Correction is required. See MPEP § 608.01(b).

Claim Objections

4. Claims 1-17 are objected to because in claim 1, line 4 "a second ejector unit" should more properly read --a second ejector group-- to provide appropriate antecedent basis for the later recitations of "the second ejector group".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

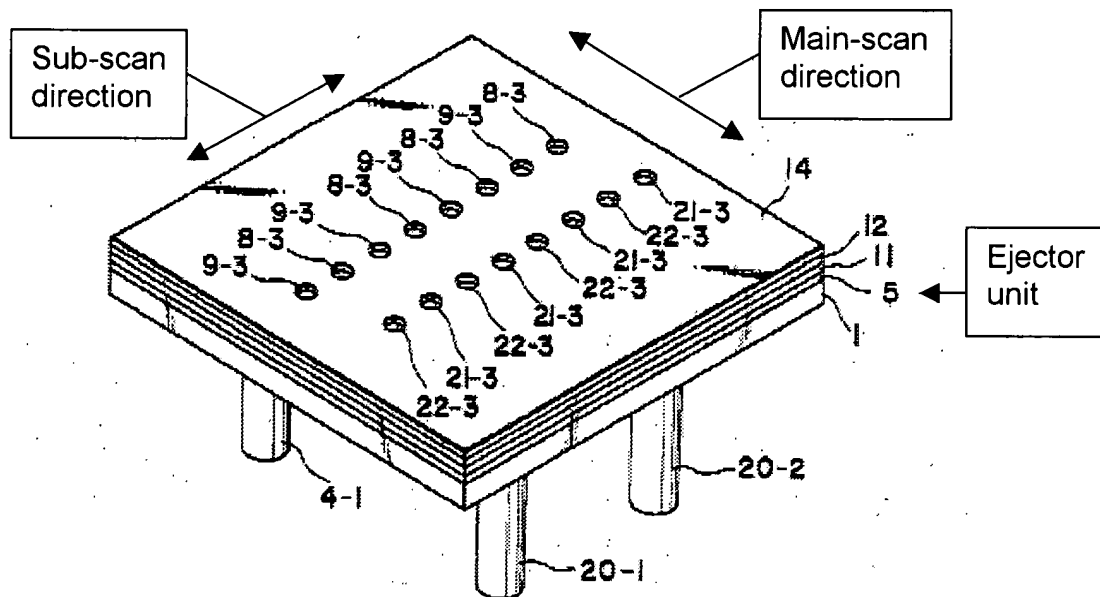
5. Claims 1-4, 5, 6, 10, 11, 13 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugitani et al. US 4,611,219.

Sugitani et al. discloses, regarding claim 1, a liquid drop discharging head (figure 3) comprising one ejector unit arranged along a main scanning direction (as shown on the following page), wherein:

the ejector unit includes a first ejector group (the ejectors corresponding to nozzles 21-3 and 22-3 in figure 3) arranged at one side in the main scanning direction and a second ejector group (the ejectors corresponding to nozzles 8-3 and 9-3) arranged at another side in the main scanning direction,

each ejector group includes a plurality of ejectors (2) (as explained in relation to column 2, lines 40-59, ejector elements 2 are provided corresponding to each nozzle to enable liquid ejection),

all of the ejectors are arranged two dimensionally in a predetermined plane (figure 3),

**FIG. 3**

each ejector includes a nozzle (the nozzles 8-3, 9-3, 21-3, 22-3 each correspond to an associated ejector 2);

all of the nozzles are offset from each other in a sub-scanning direction which is perpendicular to the main scan direction (as shown in figures 3, 7 and 8 the left column of nozzles is staggered relative to the right column of nozzles),

the nozzles of each ejector group are alternately arranged so that when they are viewed in the main scanning direction, a nozzle of one ejector of the first ejector group, a nozzle of one ejector of the second ejector group, a nozzle of another ejector of the first ejector group, a nozzle of another ejector of the second ejector group, etc. are arranged in such an order in the sub-scanning direction (as shown in figure 3 nozzles are arranged in the sub-scan direction in the order 21-3, 8-3, 22-3, 9-3, etc.)

Regarding claim 2, piezoelectric actuators are taught as the liquid drop ejectors (column 2, lines 40-44).

Regarding claim 3, each nozzle includes a liquid discharge passage (contained in layer 11), communication passage (contained in layers 5 or 12) and liquid discharge port (contained in layer 14) for ejecting the liquid as shown in cross-section in figure 1.

Regarding claim 4, each ejector includes a nozzle and pressure generating chamber (the pressure generating chambers corresponding to the spaces provided by the apertures corresponding to the ejectors 2 as shown and described in relation to figure 1).

Regarding claims 5 and 6, as shown in the embodiment of figure 7, a common passage (common passages 746-1 and 746-2 for corresponding ejector groups are connected at the lower portion to create a larger common passage) is provided corresponding to all the ejectors in the ejector unit wherein the common passage is closed at one end (the upper portion of the ejector unit as shown in figure 7) and connected to one same second common passage (744) at the other end (the lower portion of the ejector unit as shown in figure 7).

Regarding claims 10, 11 and 13, as shown in the embodiment of figure 8, common passages 856-1 and 856-2 are provided in the ejector unit for respective ejector groups wherein the common passages are closed at one end (the upper portion) and connected to second common passages (854-1, 854-2) at the other end which are disposed outside of the ejector unit.

Art Unit: 2853

Regarding claims 10 and 15, as shown in the embodiment of figure 7, in the ejector unit common passages 746-1 and 746-2 are provided for respective ejector groups wherein the common passages are closed at one end (the upper portion) and connected to a second common passage (744) at the other end.

6. Claims 1, 4, 9, 18 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsuchii et al. EP 1 186 414 A2.

Tsuchii et al. discloses, regarding claim 1, a liquid drop discharging head (figures 1A-1C) comprising ejector units arranged along a main scanning direction (printing direction of figures 1A and 1B), wherein:

each ejector unit includes a first ejector group (shown on the following page) arranged at one side in the main scanning direction and a second ejector group (shown on the following page) arranged at another side in the main scanning direction,

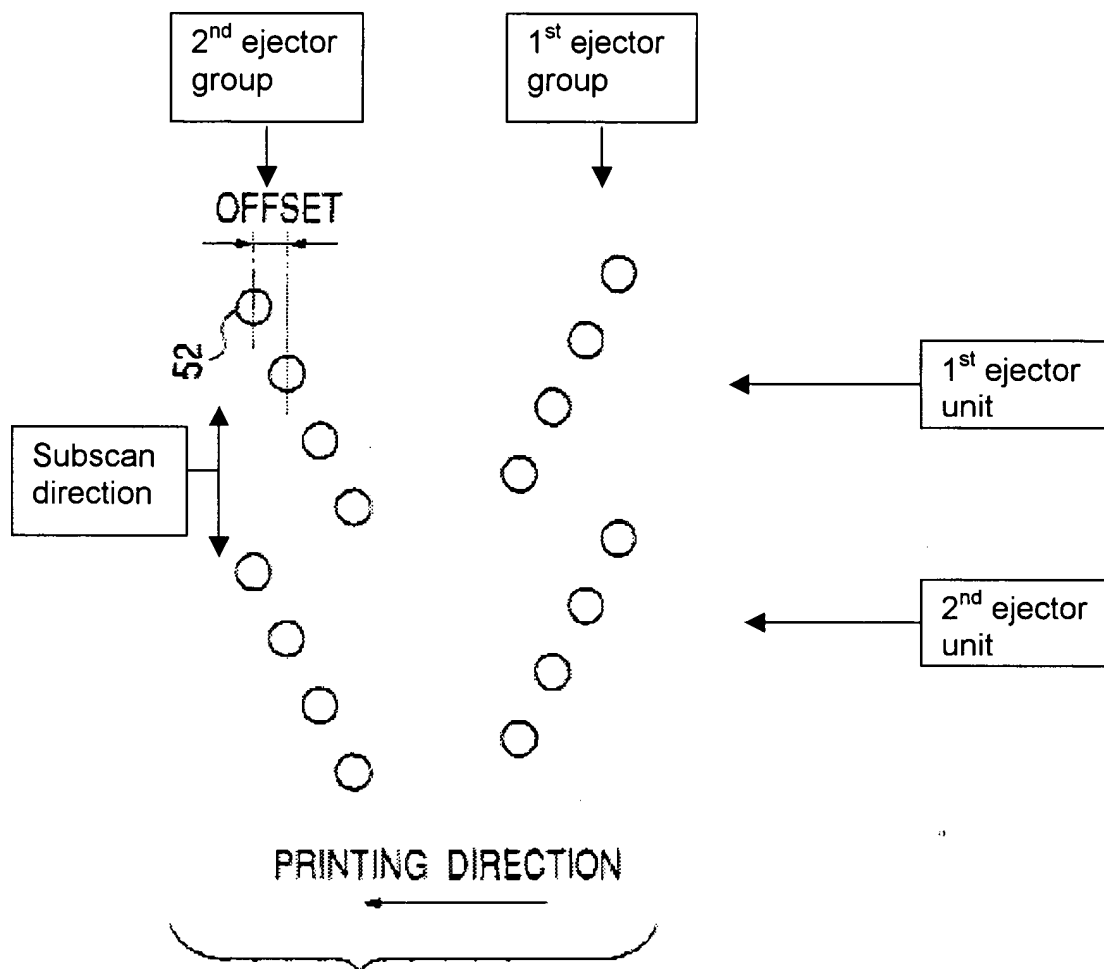
each ejector group includes a plurality of ejectors (51) (page 25, lines 25-30),

all of the ejectors are arranged two dimensionally in a predetermined plane (figure 1B),

each ejector includes a nozzle (52) (page 25, lines 31-36);

all of the nozzles are offset from each other in a sub-scanning direction which is perpendicular to the main scan direction (as evident from figures 1A and 1B),

the nozzles of each ejector group are alternately arranged so that when they are viewed in the main scanning direction, a nozzle of one ejector of the first ejector group,



a nozzle of one ejector of the second ejector group, a nozzle of another ejector of the first ejector group, a nozzle of another ejector of the second ejector group, etc. are arranged in such an order in the sub-scanning direction (as shown in figure 1B nozzles are arranged in the sub-scan direction such that the uppermost nozzle of the 1st group (right side group) is arranged, followed by the uppermost nozzle of the 2nd group (left side group), followed by the second uppermost nozzle of the 1st group, followed by the second uppermost nozzle the 2nd group, etc.)

Art Unit: 2853

Regarding claim 4, each ejector includes a nozzle (52) and pressure generating chamber (55) (figure 1A).

Regarding claim 9, all of the ejectors in each ejector unit together form a V-shape (figure 1B).

Regarding claim 18, the discharging head of claim 1 is taught to be part of a liquid drop discharging device (figure 36) including a main scanning mechanism (104) for relatively moving the head and an object (108) on which the drops are applied (page 11, line 53 – page 12, line 6).

Regarding claim 19, a sub-scan mechanism (134) moves the object (108) and the head in the sub-scan direction (figure 36, page 12, lines 7-24).

7. Claims 1, 2, 4, 8, 10 and 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Chang US 6,471,317.

Chang discloses, regarding claim 1, a liquid drop discharging head (22) comprising an ejector unit arranged along a main scanning direction (figure 2), wherein:

the ejector unit includes a first ejector group (1) arranged at one side in the main scanning direction and a second ejector group (2) arranged at another side in the main scanning direction (figure 2, column 6, lines 17-23),

each ejector group includes a plurality of ejectors (1p, 2p) (column 6, lines 60-65),

all of the ejectors are arranged two dimensionally in a predetermined plane (figure 2),

Art Unit: 2853

each ejector (1p,2p) includes a nozzle (1a,2a) (column 6, lines 60-65);

all of the nozzles are offset from each other in a sub-scanning direction which is perpendicular to the main scan direction (as shown in figure 2 and described in column 8, lines 41-49),

the nozzles of each ejector group are alternately arranged so that when they are viewed in the main scanning direction, a nozzle of one ejector of the first ejector group, a nozzle of one ejector of the second ejector group, a nozzle of another ejector of the first ejector group, a nozzle of another ejector of the second ejector group, etc. are arranged in such an order in the sub-scanning direction (as shown in figure 2 nozzles are arranged in the sub-scan direction such that the uppermost left nozzle of group 1a is arranged, followed by the uppermost left nozzle of group 2a, followed by the uppermost right nozzle of group 1a, followed by the uppermost right nozzle of group 2a, etc.)

Regarding claims 2 and 20, the ejectors are piezoelectric actuators (column 6, lines 60-65).

Regarding claim 4, each ejector (1p, 2p) includes a nozzle (1a, 2a) and pressure generating chamber (column 6, lines 60-65).

Regarding claim 8, all of the ejectors in each ejector unit together form a sawtooth shape when viewed in a plan view as indicated on the following page.

Regarding claim 10, common passage (1c) corresponds to group 1 and common passage (2c) corresponds to group 2.

Regarding claim 18, the discharging head of claim 1 is taught to be part of a liquid drop discharging device (figure 1) including a main scanning mechanism for

Art Unit: 2853

relatively moving the head and an object (23) on which the drops are applied (column 6, lines 9-12).

Regarding claim 19, a sub-scan mechanism moves the object and the head in the sub-scan direction (column 6, lines 13-16).

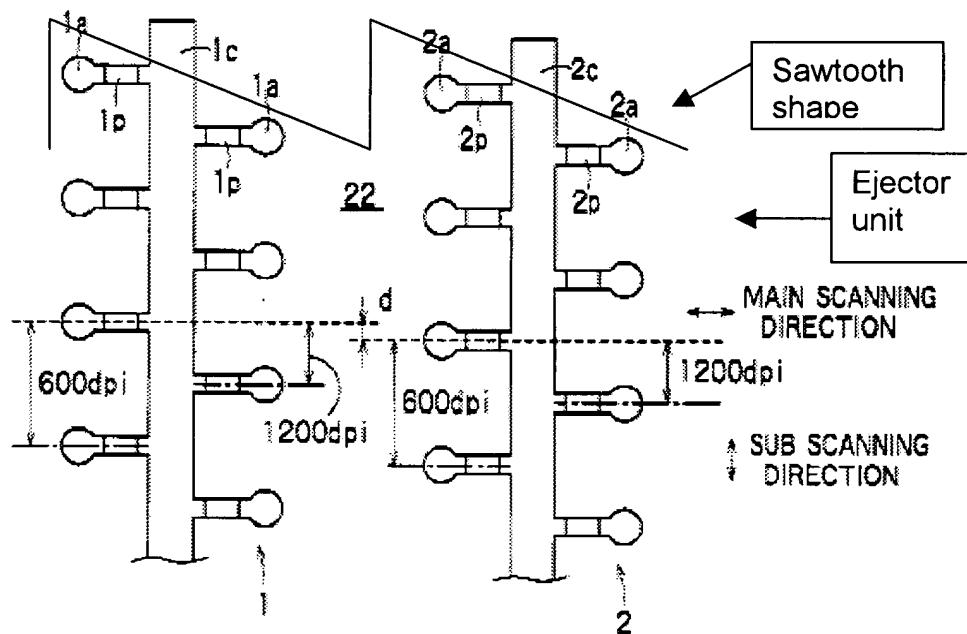


FIG. 2

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2853

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 7, 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugitani et al. US 4,611,219 in view of Bader et al. US 4,223,323.

Sugitani et al. discloses the subject matter of claims 6, 11 and 15 as explained in the 35 USC 102 rejection above with either element 744 of figure 7 or elements 854-1 and 854-2 corresponding to the second common passage or passages.

It is clear from the context of Sugitani et al. that passages 744 or 854-1/854-2 supply liquid (ink) to be ejected by the ejection elements of the discharge head from some liquid supply source.

Sugitani et al. fails to disclose that the second common passage (figure 7) or passages (figure 8) are arranged so as to extend parallel to the sub-scan feed direction.

Bader et al. discloses a liquid feed arrangement for a liquid drop discharge head in which liquid passages (88) are arranged parallel to sub-scan direction (42) with one

Art Unit: 2853

end connected to liquid supply source (86) and the other end being a supply port for the ejection element of the recording head (figure 3, column 4, lines 55-59).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to extend the second common passage(s) as shown in the embodiments of figures 7 or 8 of Sugitani et al. so as to be arranged parallel to the sub-scan direction as shown by Bader et al.

The motivation for doing so would have been to connect the liquid discharge head to a supply line in such a way so as to minimize the effects of main scan movement of the discharge head on the ink supply as explained in column 4, line 67 – column 5, line 5 of Bader et al.

Additional Prior Art

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Okuda US 6,712,454 discloses several liquid passage configurations for a liquid drop discharge head that include first common passages and second common passages (relevant to current dependent claims 10-17) including a configuration employing a center feed second common passage (figure 21b, relevant to current dependent claim 17) but fails to disclose or render obvious (alone or in combination with the art of record) such configurations for use with a first ejector group arranged on one side of a main scan direction and a second ejector groups arranged at another side in

Art Unit: 2853

the main scan direction so that the nozzles of the ejector groups are alternately arranged in the sub-scan direction as claimed.

Allowable Subject Matter

10. Claims 14 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Blaise Mouttet who may be reached at telephone number (571) 272-2150. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier, Art Unit 2853, can be reached at (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Art Unit: 2853

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Blaise Mouttet September 10, 2004

Blaise Mouttet 9/10/2004